# Medical Actinium Therapeutic Treatment (MATT) Benefits: Processes deliver new cancer treatment to thousands

For decades, medical researchers have sought better ways to fight the ravages of cancer. With adequate supplies of appropriate isotopes, Alpha Particle Immunotherapy offers a promising, revolutionary treatment. Maybe even a cure.

Current clinical trials for Acute Myeloid Leukemia using bismuth-213 derived from actinium-225 have shown remission rates of 25% in terminal cancer patients whose disease had failed to respond to other forms of treatment.

Unfortunately, extremely limited supplies are discouraging research and clinical progress. That is why INL scientists began seeking a solution.

What makes Alpha Particle Immunotherapy so effective is the nature of alpha radiation. When bismuth-213 decays, it emits a relatively large, high-energy alpha-particle. When an alpha particle hits a cell, it carries high energies that cause immediate damage, resulting in programmed cell death.

Attached to a cancer-specific targeting agent, like a monoclonal antibody, the package is a cancer smart bomb – destroying targeted cancer cells, and unlike more penetrating forms of radiation, leaving healthy cells just a few cell-layers away untouched.

This property makes alpha immunotherapy very attractive for treating blood-borne, micro-metastatic tumors, and numerous other forms of cancer.

With a 10-day half-life, actinium-225 is ideal for transport and medical use. Once delivered to the hospital, actinium-225 can be “milked” to remove bismuth-213, as needed. With a half-life of only 46 minutes, treatment can occur on an outpatient basis.

INL’s Medical Actinium for Therapeutic Treatment will make it possible to move from treating only tens or hundreds of patients each year in clinical trials, to the possibility of treating tens or hundreds of thousands of patients each year.

INL’s MATT processes will enable medical researchers, who are currently discouraged by short supplies, to continue their important work. More importantly, lives will be saved and a cure for many forms of cancer may be found.

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